

IN THE CLAIMS

1. (Currently Amended) A high-frequency amplifier connectable to a non-reciprocal circuit element having an input impedance lower than an output impedance, comprising:

a substrate;

an amplifier element provided on said substrate for receiving and amplifying an input signal;

a harmonic processing circuit provided on said substrate for providing a proper output load of harmonics included in an output signal from said amplifier element to improve an efficiency of said amplifier element; and

a filter element provided directly on said substrate to receive an output from said harmonic processing circuit for selectively passing a signal to be supplied to said non-reciprocal circuit element by using a predetermined frequency as a cutoff frequency;

wherein

~~first and second via holes are formed in said substrate for connection of a front side of said substrate with a ground electrode provided on a rear side of said substrate,~~

~~said high-frequency amplifier further comprises said ground electrode, and~~

~~said filter element includes:~~

~~a first signal line provided on said substrate to extend from an output of said~~

~~harmonic processing circuit to said non-reciprocal circuit element;~~

~~an inductor arranged on said first signal line;~~

~~a second signal line provided on said first signal line to extend from a first node on an input side of said inductor to said ground electrode via said first via hole;~~

~~a first capacitor provided on in said second signal line on said substrate;~~

~~a third signal line provided on said first signal line to extend from a second node on an output side of said inductor to said ground electrode via said second via hole;~~
and

~~a second capacitor provided on in said third signal line on said substrate.~~

2. (Cancelled)

3. (Original) The high-frequency amplifier according to claim 1, wherein the output impedance of said non-reciprocal circuit element is substantially 50 ohm, and

an output impedance of said high-frequency amplifier and the input impedance of said non-reciprocal circuit element are substantially in the range of 3 ohm to 30 ohm.

4. (Cancelled)

5. (Original) The high-frequency amplifier according to claim 1, wherein said amplifier element amplifies a fundamental frequency represented by f_0 and said predetermined frequency represented by f_c satisfies a relation of $f_0 < f_c < 2f_0$.

6. (Withdrawn) A radio transmission device for supplying a high-frequency signal, comprising:

an amplifier element for receiving and amplifying an input signal;

a substrate having said amplifier element arranged thereon;

a harmonic processing circuit provided on said substrate for matching of harmonics included in an output signal from said amplifier element;

a filter element having at least its part provided on said substrate to receive an output from said harmonic processing circuit for selectively passing the output by using a predetermined frequency as a cutoff frequency;

a first transmission line for transmitting the output from said filter element; and

a non-reciprocal circuit element receiving a signal from said transmission line for non-reciprocally transmitting the signal in the direction in which the signal is transmitted from said transmission line, said non-reciprocal circuit element having an input impedance lower than an output impedance.

7. (Withdrawn) The radio transmission device according to claim 6, wherein said filter element includes:

an inductor provided on said substrate and arranged on a signal line extending from an output of said harmonic processing circuit to said first transmission line;

a first capacitor provided on said substrate and arranged on said signal line and between a first node on an input side of said inductor and ground; and

a second capacitor provided on said substrate and arranged on said signal line and between a second node on an output side of said inductor and said ground.

8. (Withdrawn) The radio transmission device according to claim 6, wherein said filter element includes:

a first capacitor provided on said substrate and arranged between ground and a first node on a signal line extending from an output of said harmonic processing circuit to said first transmission line;

an inductor provided outside said substrate and arranged on said signal line at a part of said signal line extending from said first node to said first transmission line; and

a second capacitor provided outside said substrate and arranged on said signal line and between a second node on an output side of said inductor and said ground.

9. (Withdrawn) The radio transmission device according to claim 6, wherein said filter element includes:

a first capacitor provided on said substrate and arranged between ground and a first node on a signal line extending from an output of said harmonic processing circuit to said first transmission line;

a second transmission line provided outside said substrate and arranged on said signal line at a part of said signal line extending from said first node to said first transmission line; and

a second capacitor provided outside said substrate and arranged on said signal line and between a second node on an output side of said second transmission line and said ground.

10. (Withdrawn) The radio transmission device according to claim 6, wherein the output impedance of said non-reciprocal circuit element is substantially 50 ohm, and

the input impedance of said non-reciprocal circuit element is substantially in the range of 3 ohm to 30 ohm.

11. (Withdrawn) The radio transmission device according to claim 6, wherein first and second via holes are formed in said substrate for connection of a front side of said substrate with a ground electrode provided on a rear side of said substrate, said radio transmission device further comprises said ground electrode, and said filter element includes:

- a first signal line provided on said substrate to extend from an output of said harmonic processing circuit to said non-reciprocal circuit element;
- an inductor arranged on said first signal line;
- a second signal line provided on said first signal line to extend from a first node on an input side of said inductor to said ground electrode via said first via hole;
- a first capacitor provided in said second signal line on said substrate;
- a third signal line provided on said first signal line to extend from a second node on an output side of said inductor to said ground electrode via said second via hole; and
- a second capacitor provided in said third signal line on said substrate.

12. (Withdrawn) The radio transmission device according to claim 6, wherein said amplifier element amplifies a fundamental frequency represented by f_0 and said predetermined frequency represented by f_c satisfies a relation of $f_0 < f_c < 2f_0$.

13. (New) The high-frequency amplifier according to claim 1, wherein

first and second via holes are formed in said substrate for connection of a front side of said substrate with a ground electrode provided on a rear side of said substrate, said high-frequency amplifier further comprises said ground electrode, and said filter element includes:

- a first signal line provided on said substrate to extend from an output of said harmonic processing circuit to said non-reciprocal circuit element;

- an inductor arranged on said first signal line;

- a second signal line provided on said first signal line to extend from a first node on an input side of said inductor to said ground electrode via said first via hole;

- a first capacitor provided on said second signal line on said substrate;

- a third signal line provided on said first signal line to extend from a second node on an output side of said inductor to said ground electrode via said second via hole; and

- a second capacitor provided on said third signal line on said substrate.

14. (New) An amplifier module connectable to a non-reciprocal circuit element having an input impedance lower than an output impedance, the amplifier module comprising:

- an input terminal for receiving an input signal,

- an output terminal for providing connection to said non-reciprocal circuit element,

- an amplifier element responsive to the input signal for producing an amplified signal,

a harmonic processing circuit responsive to the amplified signal for providing a proper output load of harmonics included in the amplified signal to improve an efficiency of said amplifier element, and

a filter element provided between the harmonic processing circuit and the output terminal of the amplifier module for performing frequency filtering of a signal produced by said harmonic processing circuit in order to pass to the output terminal an output signal in a predetermined range of frequencies.